A clog in the world's carbon dioxide 'sinks'

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The capacity of the world's oceans and land to absorb carbon dioxide released into the atmosphere by industrial activity is diminishing, raising the possibility that global warming will happen more rapidly and will be more dramatic than is currently anticipated, a new research paper says.

The paper, by an international team of scientists and published yesterday in the online edition of the Proceedings of the National Academy of Sciences, says nature's reduced ability to remove carbon dioxide that humans are adding to the atmosphere, along with surging world economic growth, explain why atmospheric concentrations of the gas rose in the 2000-2006 period at the most rapid seven-year pace since modern record keeping began in 1959.

"All of these changes characterize a carbon cycle that is generating stronger-than-expected and sooner-than-expected climate forcing," the paper concludes.

Carbon dioxide concentrations are at the highest level in the past 650,000 years, and probably the past 20 million years, according to the paper.

About half of the carbon dioxide released into the atmosphere by human activity is later absorbed by water in the ocean and plants on land, a process that has led scientists to dub them "sinks." This natural process has blunted the full impact of greenhouse-gas emissions from human activity on the world climate.

The failure of the oceans and land to absorb as much carbon dioxide as they once did is being attributed to global warming, and is raising the worrisome possibility that this could lead to a cycle of weather destabilization that could cause the pace of warming to accelerate, according to one of the study authors.

"It's a positive feedback whereby sinks appear to be responding to global warming in a way that increases global warming," said Corinne Le Quéré, a researcher at the University of East Anglia in the United Kingdom, and at the British Antarctic Survey. "It's not good news."

Dr. Le Quéré said the rapid growth in the atmosphere's carbon dioxide concentration in the seven-year period was "beyond the worst scenarios" outlined by most experts and indicates that getting the threat of climate change under control will be more difficult than expected.

The research team also included scientists based in Australia, the United States, France and Austria.

The paper says the large number of major droughts in mid-latitude regions from 2002-2005 cut plant growth, leading to the reduced carbon dioxide uptake on land. When plants grow, they remove carbon dioxide from the atmosphere. In the oceans, global warming has caused increased wind around the Antarctic Ocean, churning up carbon rich waters that are normally isolated from the atmosphere.

The amount of carbon dioxide staying in the atmosphere is about 5 per cent more than expected, based on the trends observed since the late 1950s.

If the reduced ability of nature to remove carbon dioxide from the atmosphere weren't worrisome enough, the paper says carbon emissions due to the burning of fossil fuels have increased significantly.

So far this century, emissions have surged 3.3 per cent a year, more than double the 1.3 per cent annual growth rate of the 1990s, and the most rapid pace of increase since the beginning of the industrial revolution more than 200 years ago.

The paper says carbon dioxide releases last year were 35 per cent above the 1990 level.

Part of the reason for the rapid rise is the burgeoning economies in many developing countries, including China and India.

However, the paper notes that for the first time in more than three decades, emissions of carbon dioxide are rising more rapidly that the world's economic growth rate.

Most experts have assumed that as the world economy grows, it would require less in the way of fossil fuels to produce each unit of output, as businesses introduce energy-saving and energy-efficiency measures.

This trend of reduced carbon dioxide to produce goods was observed from 1970 to about 2000, but has since reversed.

"The recent combination of rapidly increasing emissions and deteriorating carbon intensity of [global economic output]amplifies the challenge of stabilizing atmosphere CO{-2}," the paper says.

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